

The Department of Mechanical Engineering/College of Engineering and Applied Sciences
Stony Brook University

Mechanical Engineering Seminar



Chi-Chang Lin, PhD, PE

Distinguished Professor of Civil Engineering
National Chung Hsing University, Taiwan
Visiting Scholar, University of Delaware

Lecture Title: Building Health Monitoring and Vibration Control Based on Earthquake Records

Tuesday, May 11, 2010, 11AM, Room 173 Light Engineering

Abstract

According to a recent UN report, (January, 2010), earthquake is the largest natural disaster cause of mortality, structural destruction and economic loss. In last decade, earthquake occurrence is getting more frequent and magnitude becomes larger than before. Prevention and mitigation of earthquake damage have become important issues in both research and applied fields. There is a need to link the newest and best available technologies to monitor and mitigate earthquake disasters. In the seminar, the speaker will present his recent results on the following research projects. (1) Structural health monitoring and damage assessment based on earthquake records from the Taiwan Strong Motion Instrumentation Program (TSMIP), a seismological database of 686 free field stations, 44 buildings, and 17 bridges. Two of the instrumented buildings experienced severe and moderate damages during strong earthquakes in 1999 and 2006, respectively. A developed building damage index was verified to be able to identify the degree and location of damages from earthquake records. (2) Analytical development and shaking table test of multiple tuned mass dampers (MTMDs) for vibration control. A new optimum design methodology was developed with limitation of TMD's stroke. New invention patents both in Taiwan and in US were granted for the MTMD device in 2004 and 2008, respectively. (3) Active control of building seismic responses based on $H \infty$ output feedback control algorithm. An optimal design procedure was proposed with optimum selection of control parameters and considerations of limited numbers of sensors and controllers, and control force execution time delay.

Biography

Chi-Chang Lin received his Ph.D. degree from the State University of New York at Buffalo in 1989. He joined National Chung Hsing University (NCHU) in Taiwan as an associate professor in 1989 and was promoted to professor in 1996. He was the Department Chair of Civil Engineering (1998-2001), a Visiting Scholar at the University of California at Berkeley in 2002, the Dean of College of Engineering (2003-2009), the Director of Center for Environmental Restoration and Disaster Reduction (CERDR) (2006-2009) at NCHU, and the Vice President of NCHU (2004-2005). Dr. Lin has been a Distinguished Professor of Civil Engineering at NCHU since 2007 and is currently a Visiting Scholar at University of Delaware. His research interests include structural system identification and damage assessment, earthquake engineering, passive and active structural control, train-induced vibration, and soil-structure interaction. He has authored and co-authored more than 100 technical papers in international scientific Journals and Conferences, and served as Guest Editor for a special issue of Journal of Structural Control and Health Monitoring. He is a member of ASCE and Earthquake Engineering Research Institute (EERI) in US. Dr. Lin has received numeral awards and honors including the Distinguished Research Awards from Taiwan National Science Council (NSC) in 1993, 1994, and 2005, the Excellence Teacher Award of Taichung City in 2005 and the Outstanding Engineering Professor Award from Taiwan Chinese Institute of Engineers in 2007.

Directions: Please call Augusta Kuhn at 631-632-8310 for more information.

Refreshments will be served.

